

WATER ALLOCATION PROGRAM ADVISORY COMMITTEE (WAPAC) MEETING PROCEEDINGS

Thursday, February 27, 2003

1. COMMITTEE INTER-RELATIONSHIPS

Ms. Crawley welcomed Committee leads. She stated that the purpose of the meeting is to help the committees understand the discreet differences as well as the inter-relationships between the committees. She stated that the format of today's meeting had changed based upon input from the leadership session on February 13. Committee leaders felt that the exchange of ideas and distinctions about the focus and scope of work in the various committees was helpful. She referred to a list of themes that she and Connie McGreavy had developed to help facilitate the morning's discussion. The list was tailored from the themes developed by the full group in the November meeting. She acknowledged and thanked the leads for their commitment of time and expertise during the month of February. She stated that this month they were working hard together to clearly define content, timelines and work products. Ultimately the goal is to produce reports with recommendations from the sub committees to the full committee. The full committee would then add an executive summary with prioritized recommendations from the committees to be submitted to the Water Resources Board for action.

Mr. Cute reported that the Out of Basin Transfer Committee was currently producing a GIS based map that graphically portrays the movement of water within the Wood-Pawcatuck Watershed. In their most recent meeting, they decided to focus on a subwatershed tied to the HUC 12 nomenclature. He stated that the committee had decided to use that level in its definition of an interbasin transfer with the exception of the Salt Pond Management Areas where those delineations may be smaller. He distributed six data summary tables taken from the preliminary Pawcatuck study. There was a question about the other watersheds since the map only portrays the Pawcatuck. Mr. Cute stated that their purpose of going through the exercise in the Pawcatuck is to develop a system for analyzing the information and using the data to assist in developing recommendations statewide. He stated that they wanted to explore an even smaller area to fully grasp the issues. Mr. Meyer stated that they would use data from the Kingston Water system to further refine data in the report and map out the issues in the Chipuxet subbasin. Discussion ensued about the level of analysis. The HUC 12 level with over forty watersheds is difficult for statewide allocation planning and management. Yet mapping the interbasin transfer data for the entire watershed was overwhelming. The challenge will be to work at a level that is meaningful across the issues related to allocation.

Ms. McGreavy indicated that leads could distribute maps and information to other committees. She stated that mapping will be challenging because we are relying

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on outside resources. Ms. Veeger cautioned the committee about using or distributing the preliminary study data until it has gone through the USGS review process and is in final form. Ms. Marks asked that there be a notation on any final map about the fact that surface water and groundwater divides are not necessarily the same.

Ms. Crawley directed the group's attention to the list of themes. She stated that several committees are involved in initiatives to identify critical areas. The Impact Analysis Committee, for example, is assembling existing GIS information pertaining to sensitive/critical environmental areas. The goal is prioritize sensitive areas, assess how those areas interface with population growth and how those future trends will affect water resources: either what they will yield from a public supply perspective or support in terms of sustainability of the resource. Mr. Marino asked a question about a diagram of water authority that will be needed for his committee's work and Ms. McGreavy noted that this was the first item on the themes list and that most committees will use the information as it relates to their focus. Mr. Thompson summarized the project noting that a meeting is scheduled next week to refine the chart and scope of the project.

Ms. Collins stated that the **Impact Analysis Committee** will focus on pilot areas, priority areas identified by other agencies and other features of econ development, including growth centers and Quonset Davisville. On March 7, the committee will host an expert from Vermont (Gund Institute) to review quantitative analysis techniques and literature pertaining to the economic value of water resources to. A goal is to identify methods for quantifying the economic value of the environment in Rhode Island. The committee is assessing where are we reaching capacity constraints, when and what are the forces driving that. They are currently compiling the different safe yield figures from the Water System Supply Management Plans in the two pilot basins, current information about water supply, land use, demographic trends, and how it comes together. A committee goal is to understand the dynamics between capacity and demand.

The **Water Rates Committee** is exploring the relationship between the value of water and the cost of providing water. Although it is difficult to grasp, the committee hopes to evaluate the cost of preserving the resources. The goal is to establish a pricing structure to charge for the full value of water and to sustain the resource. Demand management fees, set asides and conservation funds are under discussion.

Mr. Marino described the work of the **Joint Funding and Advocacy Committee** as a two-stage process. The first is to map out spending on water management by various agencies and analyzing that information to leverage opportunities. This analysis does not appear to have been done before. Advocacy will depend upon this budget analysis.

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Ms Whitehouse reviewed the work of the **Education Committee** to date noting the application for an EPA grant to fund a future edition of URI CRC's Water Magazine. The publication will highlight the Water Allocation Program Advisory Committee's findings and recommendations. The education committee will become more active in June when reports are prepared and submitted by the subcommittees.

Most committees are dealing with differences between normal times and during shortages or drought. The **Integrated Water/Wastewater Committee** is exploring potential demonstration opportunities for large-scale water reuse modeled after efforts like those in Jamestown, Johnston and Burrillville. In addition, they are exploring smaller scale opportunities to minimize potential water conflicts. They are mapping water users likely to experience conflict during shortages (golf courses, ornamental farms, turf farms) along with wastewater facilities to identify potential opportunities for reuse.

2. PRESENTATION ON FACT-BASED SCENARIO: RICHMOND, RI

(This was the start of the full Water Allocation Program Advisory Com. Meeting.)

Mr. W. Michael Sullivan, Richmond Town Council President

The Richmond Commons proposal involves about 500 acres of land close to I-95 which will be zoned in a gradient from industries to residential. The design specifications are intended to discourage Rt. 2 style sprawl with curb cuts for every business. The site has a number of pre-existing uses including housing, three landfills, a dairy farm, and an elementary school. Ground water flow is away from the site in both NW and SE directions with DEM's largest fish hatchery lying to the SE. The hatchery is one of the most sensitive uses to water quality.

The Planned Unit Development Village Center (PUDVC) is designed to create a coherent community center with:

- "Flex tech" corporate / industrial park.
- 500 units of age-restricted housing for people 55 and up (200 in phase I), including congregate care, condominiums. The minimum unit cost is \$250,000.
- Professional office uses.
- 3 entrances to an internal road system (to avoid numerous curb cuts on the main road).
- 14 miles of roads and new water infrastructure to be built by private developer.

This project is driven by Richmond's fiscal need to grow the tax base without adding significantly to school costs. The age restriction for all the planned

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housing will minimize new children attending school. The full build out estimate for the development is 20 to 25 years. The estimated total value is \$350 million.

Richmond has a Growth Management Ordinance that permits 36 single family houses a year. The ordinance has been challenged in court and survives. Typically, every 240 new single-family homes result in 500 new school-age children requiring a new school. Currently, the area has excess water supply, but insufficient pressure to serve the proposed development. The system has a 600,000-gallon tank, a well and a back-up well that supply 800,000 gallons a day. The development will necessitate a new well field off-site and a new water storage tower on-site to provide adequate water pressure. The Richmond water system was established by the Water Resource Board because local wells had been contaminated by a gas station and subsequently sold to the town.

Environmental concerns on the property include a rare and endangered dragonfly (National Heritage Program) that prompted a 150-foot setback instead of the 50-foot required for the wetland; an EPA designated sole-source aquifer; a vernal pool and other vulnerable wetland systems. The area is not sewered. As a condition of the zone change, the Town Council with input from the Planning Board has specified that the wastewater treatment facilities for the site meet 50% of the specified design standard for water quality – meaning that only half as many particles of pollutants can be found at the edge of the system as the basic design standard allows. Dr. Sullivan commended the Richmond Town Council for taking this position, which will add to the engineering costs. Implementation, monitoring, and enforcement of the standards will require ongoing communication between the town and DEM.

The estimated discharge of the project is 400,000 gallons a day. Keeping wastewater on site relieves some of the environmental issues. The Town is exploring opportunities to re-use the gray water from the development. A golf course is a prime candidate. Richmond is lining up economic incentives to accelerate the development of industry. The site is a State designated Enterprise Zone and Richmond is seeking the authority from the legislature to execute local tax treaties.

In summary, water resources and wastewater management are important issues. One of the conditions of the zone change was that any waste treatment system must be designed to 50% of the requirement. For example, if the requirement is 10 parts per million of nitrate at the edge, the system must be designed to 5ppm instead. The expense is borne by the developer.

Herb Johnson, Consulting Hydrologist, Town of Richmond Former Chief of RI Office, US Geologic Survey (1968-1990)

Mr. Johnson stated that he reviewed the proposed source of water supply and the proposed method of disposing of wastewater. He assessed whether they were

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practical and might adversely impact the major sand and gravel aquifers that underlie the Town of Richmond. His report to the Town was distributed. He directed the group to a map showing principal groundwater aquifers in Rhode Island noting the combination of stratified drift and till areas. The groundwater reservoir is comprised of a thick body of highly permeable sand and gravel that has the capability of storing water and supporting high yield wells. Public supply wells and contributing areas are located one half mile northwest of the Richmond Commons site. The wells are just North of I-95. There is a groundwater drainage divide. On one side of the divide, all of the water drains south into Meadow Brook which drains into the Pawcatuck River in the vicinity of Wood River Junction. On the other side of the divide, the water flows into the Wood River downstream from the public wells. The engineering documents that he reviewed for the Town of Richmond concluded that based upon an analysis of the potential yield of the two existing supply wells, that there was not sufficient water to support the Richmond Commons project at full build out. The engineers estimated that a new well or wells would be required capable of supplying a maximum or peak yield of 450 gpm (750,000 gpd) and an average of about 330 gpm (roughly 480,000 gpd) at full buildout over seven years. With regard for wastewater, the engineers concluded that Individual Sewage Disposal Systems (ISDS) were appropriate and the most feasible way of disposing of wastewater. The Richmond Planning Board has required pretreatment before water is discharged into an ISDS. The primary purpose of pretreatment is to reduce nitrate/nitrogen in the groundwater.

Mr. Johnson stated that he concurred with the engineers that most of the water required to supply the development would have to be obtained off-site in additional wells. He recommended that new wells be developed in the area where the current public supply wells are located. The USGS has completed a modeling analysis of the Upper Wood groundwater reservoir and concluded that the area where the wells are located can produce as much as 2.5 million gpd- considerably more than the Richmond Commons development requires. He noted that the amount also exceeds the combined need of the development and the amount currently pumped from the existing wells. He concluded that there is available water for the development and to support additional population growth in the Hope Valley area. One of the major advantages of having the water supply located near the public wells is that much of the drainage area that sustains the streamflow in the area comes from the upper reaches of the Wood River Basin. The drainage area abuts the Arcadia Management Area protecting the quality of the water from the wells now and into the future. Another advantage is that much of the water comes from these wells that are only a few hundred feet from the Wood River where the infiltration inducement from the river

Regarding the method of wastewater disposal, Mr. Johnson advised the Town that it would be a reasonable means of disposing of wastewater as long as they could keep the concentration of nitrate nitrogen below 5 milligrams per liter. This opinion was offered before the Town decided to require pretreatment which

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makes the method even more acceptable. One concern about the wastewater disposal plans regarded the earth removal plan submitted by the developer that proposed lowering groundwater levels from an elevation of about 280 feet to a base level of about 130 feet in the area of the development where most of the housing is proposed. In justifying the use of ISDSs, developers indicated that existing soils were capable of absorbing the wastewater. Mr. Johnson's concern was that once they removed soil down to bedrock, what would they replace it with? This was not addressed and he expected that it would be addressed in modifications to the plan. The good news about using ISDSs is that much of the water is available for reuse. If the 450 gpm were used for sustained periods about 85% is returned into the groundwater flow system. Most of the water for the project will be for sanitary use. Mr. Johnson then outlined the areas that result in recharge and concluded that, due to the location, it could actually cause a small increase in the flow at Meadow Brook particularly during low flows. He stated that if most of the water flowed in the other direction following the natural drainage it would go into the Wood River affecting the flow. The average flow at Wood River Junction station is 100mgd. The flow equal or exceeding 99% is about 9.6 mgd so, .7 mgd would not cause net streamflow depletion. The bad news is that not all contaminants will be removed. Many of the constituents of wastewater such as sodium, potassium chloride, sodium sulfate, bicarbonate, and nitrogen, are going to remain and concentrations will increase resulting in small increases in dissolved solids of the receiving groundwater and surface water bodies. Most of the biological contaminants will be removed before the water gets to the water table.

The increase in dissolved solids in the groundwater does not necessarily pose a major problem for drinking water supplies as long as the concentrations are increased only moderately. The increase can be controlled if the volume of wastewater that is discharged per unit area within these groundwater reservoirs or within the Pawcatuck River Basin or other basins in Rhode Island can be controlled. At a recent Impact subcommittee, meeting Russ Chateneau of DEM indicated that the state of Massachusetts was already regulating the volume of wastewater discharge to the ground on a unit area basis (gallons per day per acre). This is an area that one or more of the subcommittees in the water allocation effort should evaluate. In other words, how much wastewater can be returned to the groundwater flow system without adversely impacting the water quality in the ground and in the receiving streams.

In summary, the principal advantages of the project are that much of the water can be returned to the groundwater flow systems and streams minimizing stream flow depletion, a concern of the people that are managing the fisheries. While some degradation of water quality is expected and in fact, most streams in Rhode Island have experienced degrees of degradation with development in the basins. Regarding this development, the least effect will be experienced in developing water supply in the upper reaches of the Wood River areas where controls on volume, type, quality can be kept at a reasonably high level for safe drinking.

Questions and Discussion

Mr. Johnson clarified that the engineers for the developer looked at the existing wells and concluded that there was not enough capacity to provide the amount of water needed. He stated that it might be feasible to develop the Northwestern part of the site that is underlain by stratified glacial drift (upper Wood River area). The thickness and transmissivity of that material according to the USGS is adequate to produce yields of as much as 100 to 150 gpm but it would not sustain the 450 gpd needed to support the development without undesirable effects. In response to a question, Mr. Sullivan responded that the wellhead protection area is already delineated as a 1400-foot radius around the public supply wells.

A question was asked about whether seasonal variations and lawn irrigation would change the analysis. Mr. Johnson stated that the USGS estimates about 70 gallons per day of water used per person on an average annual basis. This figure includes lawn irrigation. Mr. Johnson stated that lawn irrigation is included in the 15% consumptive use figure (85% returns to the groundwater system). Mr. Sullivan added that the design of the planned unit development including the 200-unit village center (20% greenspace, 40% impervious surface coverage) does not provide for a substantial amount of residential lawn. The assumptions of irrigation inefficiency and recharge do not hold true. The larger issue has been stormwater management given impervious surface coverage. Mr. Sullivan added that the Town had concerns due to DEM's trout hatchery located approximately one half mile south on Route 112. Technically enough water could be supplied on site to support the development with a series of wells. However, that scenario would have clear low flow impacts on the Meadow Brook system. Thus, developing off-site supply in the current wellfield and constructing water storage tower on site for pressure generation is a more viable option with less impact. The bigger overall water issue is movement from the Pawcatuck to the Meadow Brook where there will be enhanced flow. He mentioned the Foxwoods Golf and Country club, the Meadow Brook Golf course and the desire to explore the use of wastewater to irrigate rather than continuing to extract groundwater. Age-restricted housing tends to be 60-65% of normal residential use. The combination of age restricted housing and golf courses can reduce overall consumption and enhance greenspace and wastewater reuse opportunities. The only restriction to date is the requirement to pretreat to bring overall nitrate levels down, but other alternatives are under discussion for reuse and conservation. Prepackaged treatment plants have also been discussed.

A question was asked about the treatment of stormwater, specifically, how non residential wastewater discharge would be handled which may impact recharge, stream flow and water quality in Meadow Brook. Mr. Sullivan said that the current agreement, which is evolving, states that interbasin transfer of stormwater should be avoided. Impervious surfaces are limited to 40% of ground cover. Paving shall be permeable where possible. Stormwater retention/detention basins will be as invisible as possible to the occupant or person passing through. In

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summary, the preliminary approach to managing stormwater includes limiting impervious coverage, enhancing permeability, hiding detention areas, and avoiding interbasin movement. All stormwater will be infiltrated on site. Mr. Johnson stated that he did not assess the impact of stormwater runoff on groundwater quality. Much of the water that runs to the west is going to infiltrate a segment of stratified sand and gravel on the western part of the site. The Town has discussed the monitoring of stormwater extensively with the developer. The agreement calls for edge of property monitoring, and reporting of water quality and quantity data.

In regards to water availability, Mr. Johnson stated that his analysis relied on safe yield calculations as determined by the USGS and well capacity as reported by the engineers. He further explained that the USGS model takes the into consideration. The water taken out of the river by groundwater infiltration is captured. Normally, that water would flow to the ocean within a few days. Pumping gallons per day- most of which will come out of the river, results in recharge that was not available previously. That water flows slowly back to the streams at roughly one foot to two feet per day.

Respectfully Submitted,

Kathleen Crawley
Supervising Planner, RI Water Resources Board